

## **Environmental Stewardship**

Milwaukee has an abundant water resource in Lake Michigan, ample water treatment and distribution capacity, and returns all water to the lake. As a steward of this resource, the Milwaukee Water Works (MWW) uses sustainable practices such as supply side conservation, water accountability, energy conservation, operational efficiency and consumer advocacy to “Use Water Wisely.” These practices ensure the long-term availability of safe and affordable drinking water while considering other water uses (e.g., agricultural, recreational) and other priorities (e.g., environmental health, economic prosperity and social welfare).

### **The need for efficiency and water savings**

Water use in Milwaukee has steadily declined during the past three decades, a result of more efficient water use and conservation and changes in the industrial landscape. Water sold decreased from 58 billion gallons in 1976 to 32 billion gallons in 2011.

- Commercial customers apply ever more efficient processes that use less water.
- Residential customers use 2% less water each year without active promotion of conservation, due in part to high-efficiency appliances and plumbing fixtures; new housing is more water- and energy efficient.
- The daily per-person, indoor and outdoor use in Milwaukee was 46 gallons in 2011 (calculated using water sold to residential customers only). The American Water Works Association (AWWA) reports daily per-person, indoor-only use was 69.3 gallons; daily, per-person indoor and outdoor use was 171.8 gallons.
- Wastewater and sewer charges are based on water usage, driving customers to use less water to hold down charges.

Average daily pumpage for 2011 was 101 million gallons. The utility could provide over 100 million additional gallons per day while still providing for emergency fire suppression. Less water sold translates into declining revenue as costs to treat and pump drinking water increase. As water use and revenues fall, the MWW focuses on reducing costs, making operational efficiencies, and using sustainable practices.

### **Supply side conservation**

The utility saved over one billion gallons of water from 2006 to 2011. It would take decades of conservation by customers to equal this amount. The AWWA recognized the Milwaukee Water Works efforts with two awards for water efficiency in 2008.

- At the two water treatment plants, staff modified the operation of filters by extending the length of the filter runs and reducing the volume of water used to backwash filters. This efficient operation maintains high quality treated water and provides ongoing savings of 165 million gallons of treated water a year, as well as energy savings associated with less frequent use of the large washwater pumps.
- Hydrant and water main flushing programs are based on water quality parameters, not a specified length of time. Personnel use hand-held turbidimeters (devices that measure water clarity) to flush hydrants or mains only long enough to reduce turbidity to the proper level.
- To help reduce sewer overflows into Lake Michigan, flushing mains and hydrants in the combined sewer area is not scheduled during rainy periods.
- Staff invented a tank-rinsing device to dilute residual in sodium hypochlorite storage tanks before inspection, resulting in reduced water use from 95,000-150,000 gallons per process to 19,000 gallons, a savings of about 500,000 gallons of treated water per year.
- Studies are underway at the Howard Avenue Water Treatment Plant to optimize the use of chemicals while maintaining high water quality standards. Projections on expected savings have not yet been completed. Operational adjustments to reduce energy usage include careful timing of pump starts and stops to eliminate extra energy charges and replacement of older equipment with more energy efficient equipment.
- Leaks in the distribution system have been limited through a number of activities. Scheduled preventive maintenance includes targeted leak surveys to identify non-surfacing water leaks. A system-wide water leak survey was conducted in 2008 and has been followed up with surveys in targeted high-leak areas.
- In 2011, Distribution began a pilot program using an Automatic Flushing Device which automatically flushes select hydrants at a scheduled time to reduce water waste and eliminate the need for an employee to travel to the hydrant to conduct the flushing.
- The utility pressure-tests new and replacement water mains on delivery and before construction to verify they will not leak when put into service.

- The Department of Public Works no longer uses hydrants to flood water and sewer main projects to settle the soil around underground trenches, but requires contractors to use mechanical compaction to complete backfill of trenches. The change saves an estimated 20 million gallons of water per year and saves wear and tear on hydrants.
- Installation of over 2,800 hydrant-locking devices and a public education campaign has eliminated the waste of millions of gallons of treated water by reducing illegal hydrant openings during hot weather. Water wasted due to illegally opened hydrants decreased from an estimated 447 million gallons in 2006 (745 hydrant openings) to 27 million gallons in 2010 (45 hydrant openings). There were 113 openings (66 million gallons) in 2011 and 127 openings (76 million gallons) in 2012; both years saw unusually dry and hot weather.
- Milwaukee Water Works was one of the first utilities in the U.S. to have water meters for 100% of its customers.
- MWW reviews non-firefighting use of hydrants for water accountability and public safety. Metering of permitted hydrants has been increased. Cross-connection inspections are aggressively pursued. The Meter Services Shop opened a bulk water filling station in 2010 for contractors and landscapers so water is metered, paid and accounted for. The utility is working with contractors on construction and sewer projects to phase out use of hydrants for non-fire suppression activities.
- In its proactive Vacant Property Turn-Off Program, the utility disconnects water at vacant properties in Milwaukee, preventing frozen pipe damage and wasted water. MWW provides a list of addresses where the water is to be turned off to the City's Department of Neighborhood Services (DNS); DNS notifies Water Distribution when they have confirmed vacant properties and the water works turns off the water at those properties.
- The Focus on Energy Program awarded an Industrial Sector cash incentive to the utility's upgrade of its Grange Pumping Station. The 5 million-gallon-per day (mgd) capacity pump had reached its useful life and the station needed an upgrade to meet increased demands and to reduce pressure fluctuations in the district. The 2011 project included replacement of the pump with two 12-mgd pumps with variable frequency drive to maximize energy efficiency.

### **Stewardship partners**

The Milwaukee Water Works partners with other agencies to promote the health of the watershed.

- The Milwaukee Water Works has been a member of the U.S. Environmental Protection Agency (EPA) WaterSense program since 2007 and the Public Service Commission of Wisconsin (PSC) Conserve Wisconsin program since 2008 to protect water and energy resources. The utility pledged to continue to make operations more water-efficient and to provide customers with water efficiency information.
- As a member of the Milwaukee Water Council, the City of Milwaukee and the MWW provide technical support to preserve the region's freshwater resource and promote water technology business and research, and education of future water talent.
- The MWW helped produce a "Simple Solutions to Water Pollution" brochure created by Milwaukee Water Partners, a consortium of regional environmental groups and the MMSD.
- The MWW promotes collection programs for household hazardous waste, residential unused medicines, and consumer electronics; household recycling, and the Me2 energy efficiency program.

### **Consumer outreach emphasizes "Use Water Wisely – Control Water Costs"**

The utility helps consumers reduce water waste through its "Use Water Wisely" program, winner of the Wisconsin Water Association 2011 Utility Achievement Award. MWW started the program in 2010 in collaboration with the environmental group, Clean Wisconsin. In 2010-2011, of customers who returned a postage-paid feedback card, 66% found and fixed leaks, most in toilets and faucets. 60% said they used toilet leak-detecting dye tabs that were provided, and 21% said they had no leaks but found the information useful. From January-September 2012, of customers who returned the feedback card, 30 % found and fixed leaks; 70% used the dye tabs. Forty-eight percent of the leaks fixed were in toilets, 44% were at faucets, and 11% were at garden hoses. Ninety-one percent said they found the information useful.

- Bill inserts to customers provide tips in English and Spanish. A dedicated section of the utility website provides information.
- Customer Service staff review billing data to identify customers with high water use and mail a brochure, toilet leak-detecting dye tabs, and a postage-paid feedback card. Staff also provides over-the phone counseling and performs onsite investigations for high usage. Customers are directed to track and compare water use by accessing their account online at the utility website.
- City plumbing inspectors distribute "Use Water Wisely" materials to property owners who apply for permits.
- Commercial Meter Readers manually read the meters of 1,000 largest commercial customers each month, identifying changes in seasonal or monthly patterns and report discrepancies for corrective action.
- The EPA-required Consumer Confidence Report to customers features Use Water Wisely information.
- The utility has participated in the EPA "Fix a Leak Week" in March since it began in 2009, collaborating with MMSD to provide worksheets and toilet leak dye tabs to school classrooms.
- Each fall and winter, the utility advises customers to protect pipes and meters from freezing.

## Reducing energy use

- Energy efficient interior and exterior lighting is being phased in at the water treatment plants. At the Linnwood Water Treatment Plant, 500-watt incandescent bulbs were replaced with 85-watt compact fluorescents. Astronomical timers, which adjust settings as daylight periods change, were installed to ensure sufficient lighting for the safety of personnel in the filter galleries. Motion sensor-activated lighting also was installed.
- At the Howard Avenue Water Treatment Plant, lighting needs range from 24-hour exterior and interior to rooms and facilities that require light only when staff is working in an area. An energy audit and subsequent replacement of lighting fixtures reduced the use of 497 incandescent, quartz, and fluorescent lamps and light bulbs to 226 high efficiency bulbs and lamps. The “shedded load” of electrical use was 36,027 watts compared with the previous use of 53,050 watts (calculated on a 10-12 hour day).
- An energy efficient “on demand” hot water heater was installed at the Linnwood ozone building.
- Emphasis is placed on using the most energy efficient pumps for the situation to keep water flow consistent during peak and lower demand times. For example, electrical energy use at a booster station was lowered by installing a variable frequency drive on a station pump.
- A replacement heating, ventilating and air conditioning unit installed at the Meter Services Shop South uses digital controls instead of pneumatic, resulting in energy savings.
- Energy efficient windows were installed at the Linnwood plant maintenance building. Plans call for a facilities study and energy audit of heating, ventilating and air conditioning.

## Additional sustainable and green practices

- Biodiesel fuel is used as possible in utility vehicles and equipment that require diesel fuel. Hybrid electric vehicles and diesel equipment to replace gasoline units, plus ethanol E85 capable equipment, is purchased whenever possible.
- The utility renovated the Kilbourn Reservoir into a park in a multi-year public involvement project. The earth-friendly design of the park, reopened in 2008, reduces storm water pollution by returning 3.63 acres of pavement to water-absorbing vegetation.
- “Green” features at MWW facilities include natural planting areas that are not mowed. The roots of these natural plants add stability to steep hillsides and slopes, preventing soil erosion and washing of runoff into streets during heavy rains. Other benefits include low maintenance costs, less greenhouse gas production from mowing activities, and less water wasted on sprinkling.
- Recycling includes paper, plastic, glass, and aluminum, as well as materials such as batteries and fluorescent lighting, and concrete and asphalt at construction and maintenance sites.
- Administration and engineering offices compost food and paper waste for use by the Growing Power urban gardens.

## About the Milwaukee Water Works

The Milwaukee Water Works is a national leader in providing high quality drinking water and water quality monitoring. The water works is the publicly owned utility of the City of Milwaukee; policy is set by the Mayor and Common Council. The utility is regulated by the EPA and the Wisconsin Department of Natural Resources (DNR) for facilities, operations, and water quality; and the Public Service Commission of Wisconsin (PSC), for rates and accounting.

The Milwaukee Water Works serves wholesale clients who operate their own water utilities, bill customers, and maintain distribution systems in Brown Deer, Butler, Greendale, Menomonee Falls, Mequon, New Berlin, Shorewood, Thiensville, Wauwatosa, and West Allis. The water works sells water wholesale to the Milwaukee County Grounds. Retail customers receive full water service, including customer billing and distribution system maintenance: Greenfield, Hales Corners, St. Francis, Franklin (a portion); West Milwaukee receives billing services from MWW and maintains its own distribution system.

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